

04184

MCA (Revised)
Term-End Examination
December, 2015

MCS-041 : OPERATING SYSTEMS

Time : 3 hours

Maximum Marks : 100

(Weightage 75%)

Note : *Question no. 1 is compulsory. Attempt any three questions from the rest.*

1. (a) Discuss the linked and index file allocation schemes. Which allocation scheme is used in UNIX OS ? 10
- (b) A disk with 1000 cylinders is numbered 0 to 999. Compute the number of tracks the disk arm must move to satisfy all the requests in the disk queue. Assume the last request serviced was at track 345 and the head is moving towards track 0. The queue in FIFO order contains request for the following tracks :

123, 874, 692, 475, 105, 376.

Calculate the head movement for the following disk scheduling algorithms : 10

- (i) FIFO
- (ii) SSTF
- (iii) SCAN

Explain through the graph.

(c) Define the essential properties of the following types of operating systems :

- (i) Batch
- (ii) Time sharing
- (iii) Real time
- (iv) Distributed

What is spooling ? What are the advantages of spooling over buffering ? 10

(d) Describe internal and external memory fragmentation with illustrative examples. 10

2. (a) Describe a solution to the Dining Philosopher problem so that no races arise. 10

(b) Why are Translation Look-aside Buffers (TLBs) important ? In a simple paging system, what information is stored in a typical TLB table entry ? 8

(c) Define the term 'Thrashing' with an example. 2

3. (a) Explain the Crossbar and Hypercube Interconnection Network. Which one is suited for large number of nodes and why? 10
- (b) Write and explain the Dekker's solution for Mutual Exclusion. 10
4. (a) What is deadlock ? Write an algorithm for deadlock detection and explain it. 10
- (b) Explain the differences between Security and Protection. Describe the scheme of capability lists to implement protection. Explain with an example. 10
5. (a) Explain Lamport Algorithm for the event ordering in a distributed system with an example. 6
- (b) What are interrupts ? How are they handled by the operating system. 6
- (c) What is a Real Time Operating System (RTOS) ? How is it different from a Time Sharing Operating System ? Give two example applications in which RTOS is required. 8
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